



A.D. 1838 N^o 7867.

S P E C I F I C A T I O N

OF

JAMES DREW.

STEAM-ENGINE AND OTHER FURNACES.

L O N D O N :

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Steam-engine and other Furnaces.

DREW'S SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, JAMES DREW, of Manchester, in the County of Lancaster, Civil Engineer, send greeting.

WHEREAS Her present most Excellent Majesty Queen Victoria, by Her
5 Letters Patent under the Great Seal of Great Britain, bearing date at Westminster, the Eighth day of November, in the second year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said James Drew, Her especial licence, full power, sole privilege and authority, that I, the said James Drew, my executors, administrators, and assigns, and
10 such others as I, the said James Drew, my executors, administrators, and assigns, should at any time agree with, and no other, from time to time and at all times during the term of years therein expressed, should and lawfully might make, use, exercise, and vend, within England and Wales, and the Town of Berwick upon Tweed, my Invention of "CERTAIN IMPROVEMENTS IN THE MEANS
15 OF CONSUMING SMOKE AND ECONOMIZING FUEL IN STEAM ENGINE OR OTHER FURNACES OR FIRE-PLACES;" in which said Letters Patent is contained a proviso that I, the said James Drew, shall cause a particular description of the nature of my said Invention, and in what manner the same is to be performed, to be enrolled in Her Majesty's High Court of Chancery within six calendar months
20 next and immediately after the date of the said in part recited Letters Patent, as in and by the same, reference being thereunto had, will more fully and at large appear.

Drew's Improvements in the Means of Consuming Smoke in Furnaces, &c.

NOW KNOW YE, that in compliance with the said proviso, I, the said James Drew, do hereby declare that the nature of the said Invention, and the manner in which the same is to be performed, is particularly described and ascertained in and by the Drawings hereto annexed, and the following explanation thereof, that is to say:—

My improvements in the means of consuming smoke and economizing fuel in steam engine or other furnaces or fire-places, consists in providing the furnace or fire-place with a second or double set of fire-bars; the one set or outermost of which are to be fixed to the boiler seating, as in ordinary furnaces, and the second or innermost set are to be fixed upon a carriage, which shall be moveable 10 in a vertical direction immediately behind the outer set of bars; and thus the improved furnace will be divided into two distinct parts or portions, the one or ordinary half or any convenient part of which will support the fuel in the furnace, and the second or moveable set be capable of being raised nearer to or further from the bottom of the boiler, as occasion may require. The object 15 of my Invention being the more perfect consumption of smoke, and consequent economy in fuel, is effected by such novel arrangement and construction of the furnace or fire-place, as the first or outermost set of fire-bars is intended to receive the fuel when it is firstly introduced into the furnace, and the charred or red-hot coal is to be passed backwards, and thus placed upon the second or 20 moveable set of fire-bars, and immediately raised by the sliding carriage close under the bottom of the boiler, and placed nearer to or farther from the boiler, as the case may require, thus forming a narrow heated passage, causing the smoke to come into contact with the charred or red-hot coal, the heat from which passes under the bottom of the boiler on its way to the flues, and as it 25 rises from the green or fresh coal in the front part of the furnace it will be perfectly consumed in passing over the second or red-hot fire, instead of being allowed to escape along with other gaseous products to the chimney, and thereby cause a considerable saving of fuel and heat, which is commonly lost. As the principal feature of novelty is so perfectly simple that it may be readily 30 applied to any description of furnace or fire-place, I had scarcely deemed it necessary to represent its application to any one in particular, as it is evident that its adaptation to the various descriptions of furnaces must greatly depend upon the circumstances of the case; and also the mechanical arrangements and other details for raising or lowering the second or inner set of fire-bars 35 must entirely be at the option of the engineer.

It will readily be perceived that the mechanical agents or apparatus to be employed to carry my Invention into practical effect are capable of a variety of modifications, and however applied will not in the least affect the result of

FIG. 2.

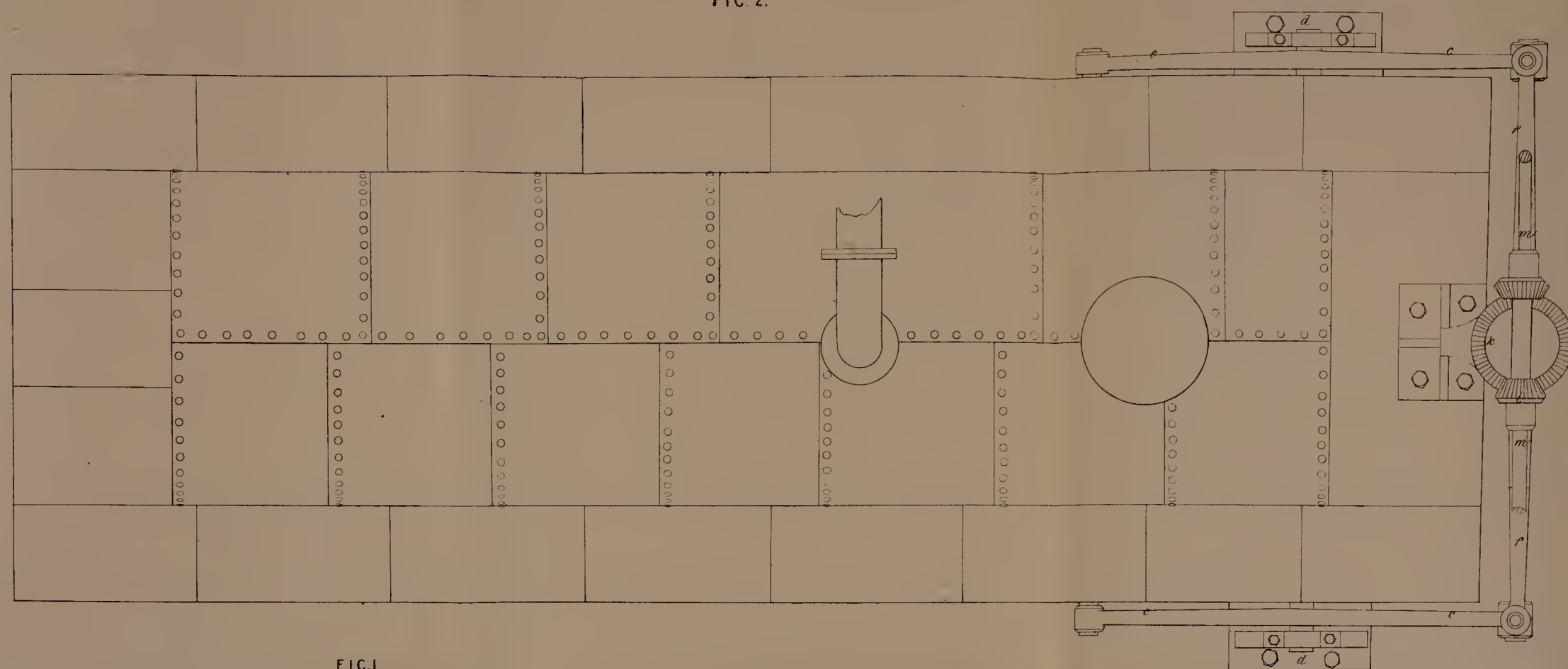


FIG. 1.

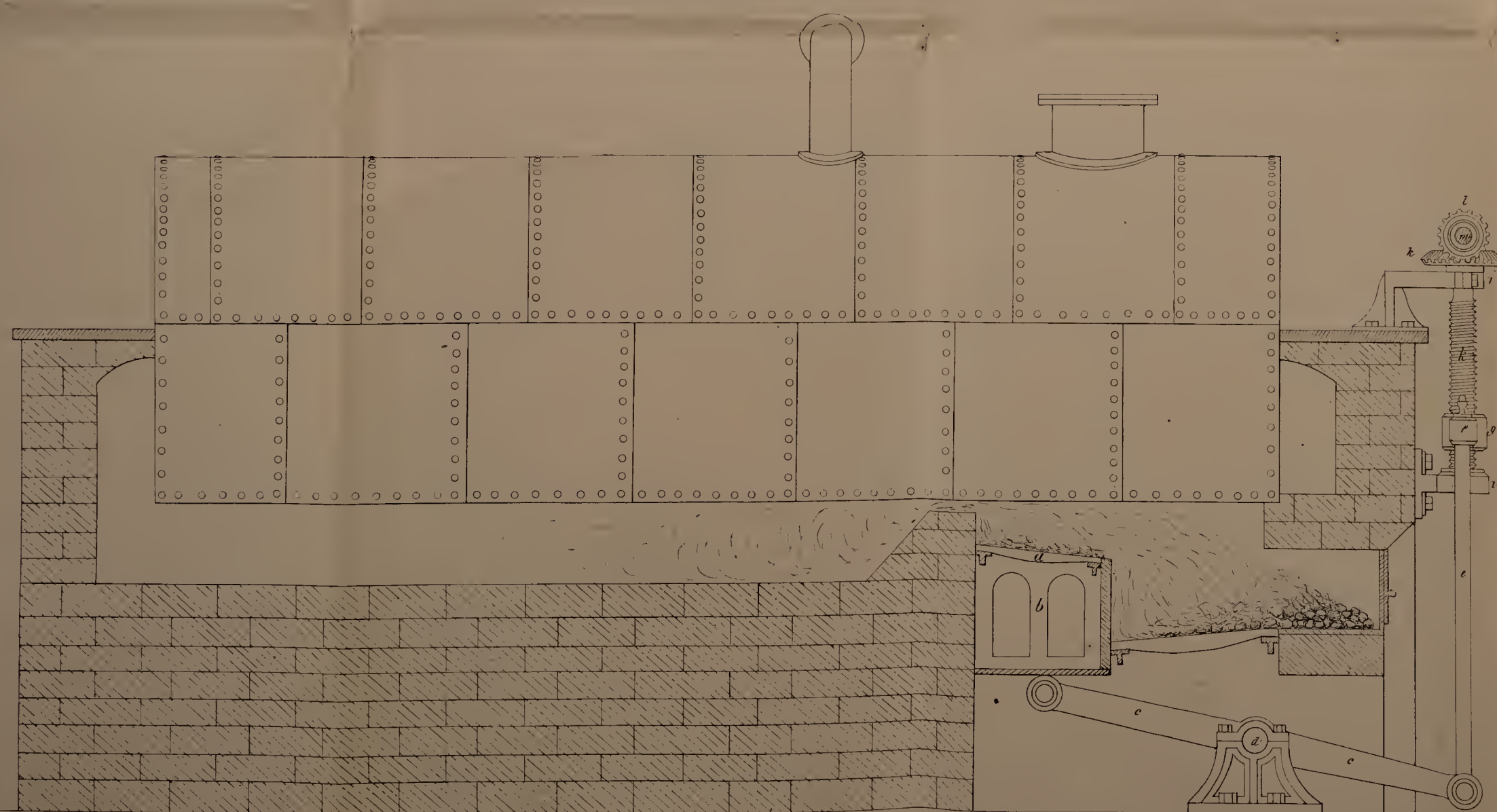
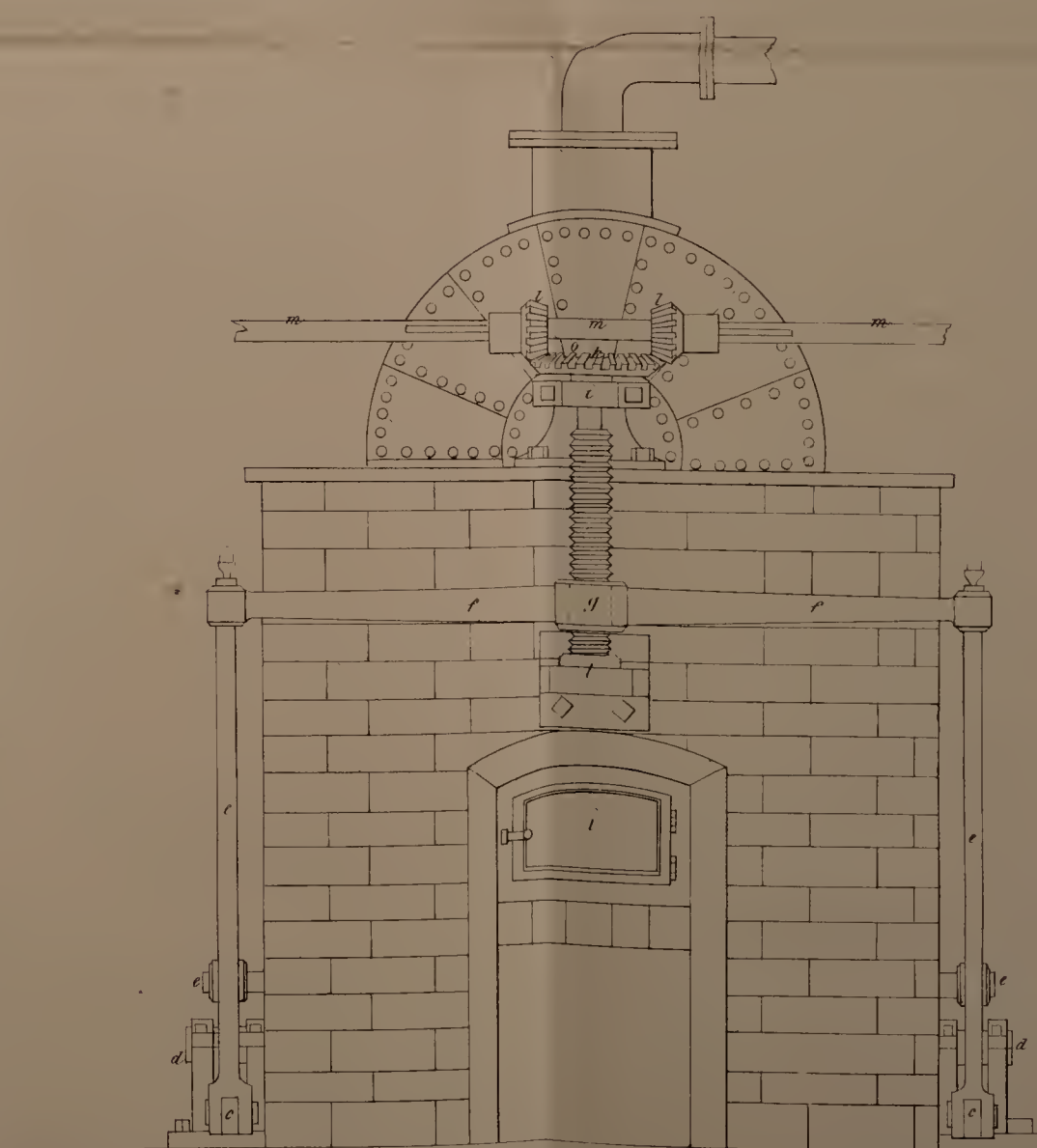



FIG. 3.





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the operation; therefore I have represented in the Drawing attached to these Presents a simple mode of working my Invention in connection with an ordinary steam engine boiler, merely for the sake of illustration. Figure 1 is a longitudinal section of an ordinary steam engine boiler and furnace; Figure 2, a plan or horizontal view; and Figure 3 is an end view of the same, in which the boiler seating, flues, furnace doors, dead plate, and bars nearest the doors, are to be fixed in the usual manner, or the bars may incline a little downwards at the farthest end from the dead plate. A second set of furnace or fire-bars *a*, (which may be placed level, or a little inclined towards the fixed bars,) are fixed upon a moveable carriage *b*; this carriage, with its set of fire-bars, is capable of being elevated and lowered in a vertical direction by running on parallel rods or slides, being fixed upon each side of the ash-pit, or by any other suitable contrivance. In these Figures the apparatus to be employed for working the carriage *b* consists of two beams *c, c*, working upon their fulcrum at *d, d*, and being elevated or depressed by means of the connecting rods *e, e*, and the cross bar *f, f*; the centre of this bar *f* carries a nut *g* working up and down the screw *h*, which is caused to revolve in its bearings *i, i*, by means of the bevil wheel *k* and pinions *l, l*, one of these pinions causing the screw to be driven in one direction and the other pinion driving it in the reverse, as the case may be. These pinions slide upon a key or feather upon the driving shaft *m*, and are thrown in and out of gear with the wheel *k* by any ordinary catch or clutch box. Now supposing the engineer to be about to throw a supply of fresh coals upon the fire, he has merely to throw that pinion into gear, which will cause the nut to ascend upon the screw, and consequently to lower the carriage *b* with its grate just a sufficient space below the front or ordinary grate to admit of the red-hot cinders and clinker to be raked out into the ash-pit; he then elevates the back grate *a* a little, until it is flush or on a level with the surface of the ordinary or front grate, when he passes a sufficient quantity of the red-hot cinders from the furnace upon the back grate *a*. The other pinion is then to be put in gear, and the carriage with its grate to be raised up within a little space of the bottom of the boiler, as seen in Figure 1; and when the fresh coal is thrown upon the fire in the front or common grate, the smoke, as it rises over the grate *a, a*, will be effectually consumed by the red fire or charred coal thereon, and the fuel and heat thus greatly economized; the process being repeated as often as found necessary.

Having thus described the object of my improvements and the manner in which the same may be carried into practical effect, I desire it to be understood, in conclusion, that I claim as my Invention the elevation of the

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second set of fire-bars or back part of the furnace, either in a level or inclined position, and the lowering of the same in the manner and for the purposes above described, in whatever situation it may be used in connection with ordinary furnaces or fire-places, and also by whatever ordinary mechanism or apparatus the same may be worked, as the lever, screw, rack, or any other well-known agent may be effectively employed, that shewn in the Drawing being merely for the sake of illustration.

In witness whereof, I, the said James Drew, have hereunto set my hand and seal, this Fourth day of May, in the year of our Lord, One thousand eight hundred and thirty-nine.

JAMES (L.S.) DREW.

AND BE IT REMEMBERED, that on the Fourth day of May, in the second year of the reign of Her Majesty Queen Victoria, the said James Drew came before our said Lady the Queen in Her Chancery, and acknowledged the instrument aforesaid, and all and everything therein contained and specified, in form above written. And also the instrument aforesaid was stamped according to the tenor of the Statute made in the fifty-fifth year of the reign of His late Majesty King George the Third.

Inrolled the Seventh day of May, One thousand eight hundred and thirty-nine.

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